

I claim:

1. A prosthetic intervertebral disc comprising:

a) a central core material having an upper surface, a lower surface and a sidewall therebetween, and

5 b) a non-resorbable outer shell having an inner surface surrounding the central core and contacting the upper surface, the lower surface and the sidewall of the core.

2. The disc of claim 1 wherein the non-resorbable shell has an outer surface, the
10 outer surface having an i) upper surface adapted to contact a natural upper vertebral endplate and ii) a lower surface adapted to contact a natural lower vertebral endplate.

3. The disc of claim 2 wherein the upper surface of the shell is convex, and the lower surface of the shell is flat or concave.

15 4. The disc of claim 2 wherein the upper and lower surfaces of the shell are convex.

5. The disc of claim 1 wherein the outer shell further comprises an upper wall having a lower thickness, and a side wall having a larger thickness.

20 6. The disc of claim 5 wherein the larger thickness of the sidewall approximates a thickness of the annulus fibrosus.

7. The disc of claim 1 further comprising:
25 c) an intermediate layer between the central core and the outer shell.

8. The disc of claim 1 having no intermediate layer between the core and the outer shell.

30 9. The disc of claim 1 further comprises:
c) a radio-opaque marker disposed within the outer shell or core.

10. The disc of claim 1 wherein the outer shell has an upper wall having an outer surface having a dry coefficient of friction against bone of at least 0.5.(*high COF*)
- 5 11. The disc of claim 1 wherein the outer shell has a high hardness and the core has a lower hardness.
12. A prosthetic intervertebral disc comprising:
- 10 a. a central core material,
- b. a non-resorbable outer shell surrounding the central core, the outer shell having an upper wall having an upper outer surface,
- wherein the upper surface of the upper wall of the outer shell has a dry coefficient of friction against bone of at least 0.5.
- 15 13. The disc of claim 12 wherein the outer surface of the upper wall of the outer shell has a surface roughness R_{\max} of no more than 0.15mm.
14. The disc of claim 12 wherein the upper surface of the shell is convex, and the lower surface of the shell is flat or concave.
- 20 15. The disc of claim 12 wherein the upper and lower surfaces of the shell are convex.
16. The disc of claim 12 wherein the outer shell comprises silicone.
- 25 17. The disc of claim 12 wherein the outer shell further comprises a lower wall having a lower surface, the lower surface having a dry coefficient of friction against bone of at least 0.5.
- 30 18. The disc of claim 12 wherein at least one of the upper and lower surfaces of the outer shell comprises a recess for receiving a pin.

19. The disc of claim 18 wherein the lower surface of the outer shell comprises a recess for receiving a pin.
- 5 20. The disc of claim 12 wherein wherein at least one of the upper and lower surfaces of the shell is flat.
21. A prosthetic intervertebral disc comprising:
- 10 a) a central core material, and
- b) an outer shell having a sidewall surrounding the core, wherein the sidewall of the outer shell has a hardness of more than 80 Shore A.
22. The disc of claim 21 wherein the central core and the outer shell are made of different grades of the same material.
- 15 23. The disc of claim 22 wherein the same material is silicon.
24. The disc of claim 21 wherein the central core has a higher hardness and the sidewall of the outer shell has a lower hardness.
- 20 25. The disc of claim 21 wherein the hardness of the sidewall of the outer shell is between more than 80 Shore A and 100 Shore A.
26. The disc of claim 21 wherein the outer shell further comprises upper and lower walls surrounding the core, wherein the upper and lower walls of the outer shell have a hardness of more than 80 Shore A.
- 25 27. The disc of claim 21 wherein the hardness of the outer shell is between 85 Shore A and 95 Shore A.

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28. The disc of claim 21 wherein the outer shell further comprises an upper wall having a lower thickness, and a side wall having a larger thickness.

29. The disc of claim 21 wherein the larger thickness of the sidewall approximates a
5 thickness of the annulus fibrosus.